

Oklahoma's **Green** Dust Bowl: What are we losing?

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EXTENSION SERVICE

Dust Bowl.....



Green Dust Bowl....

FOX 71 AccuWeather ALLERGY COUNT

Mold	344	Moderate
Cedar	675	Heavy



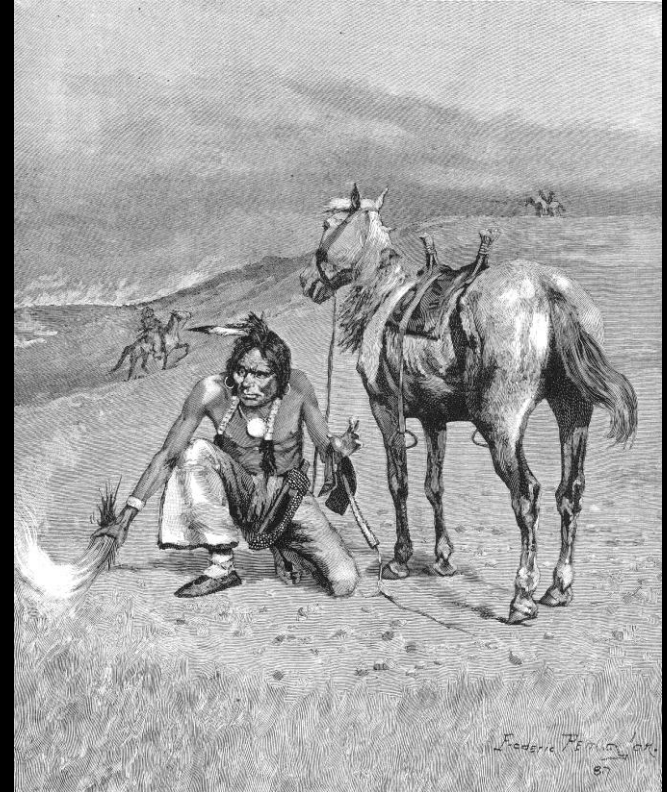
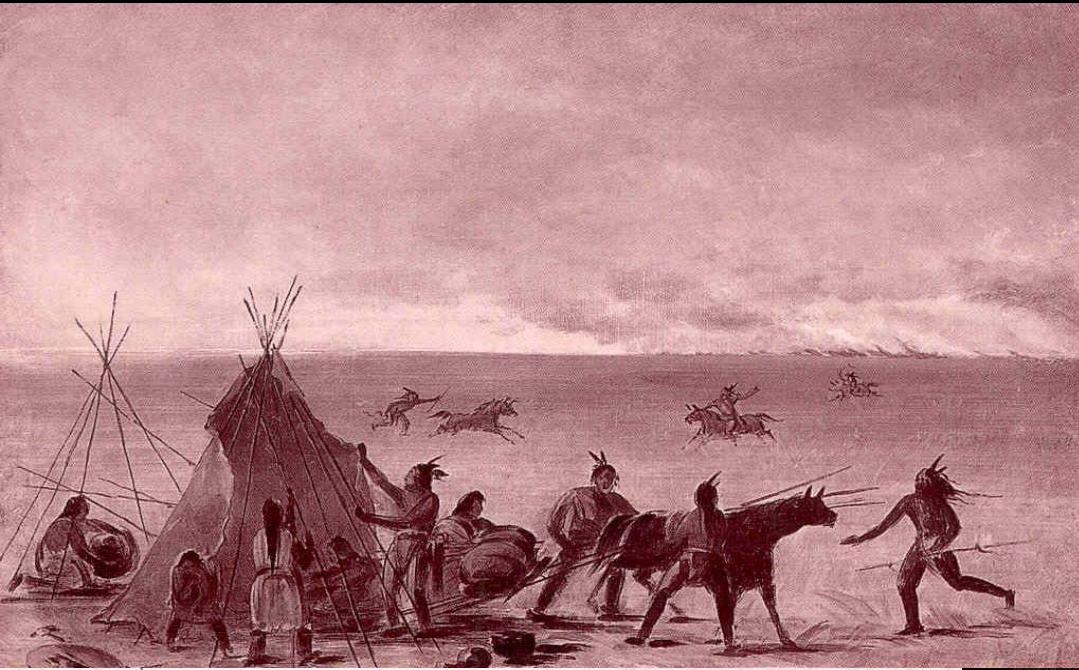
Disturbance

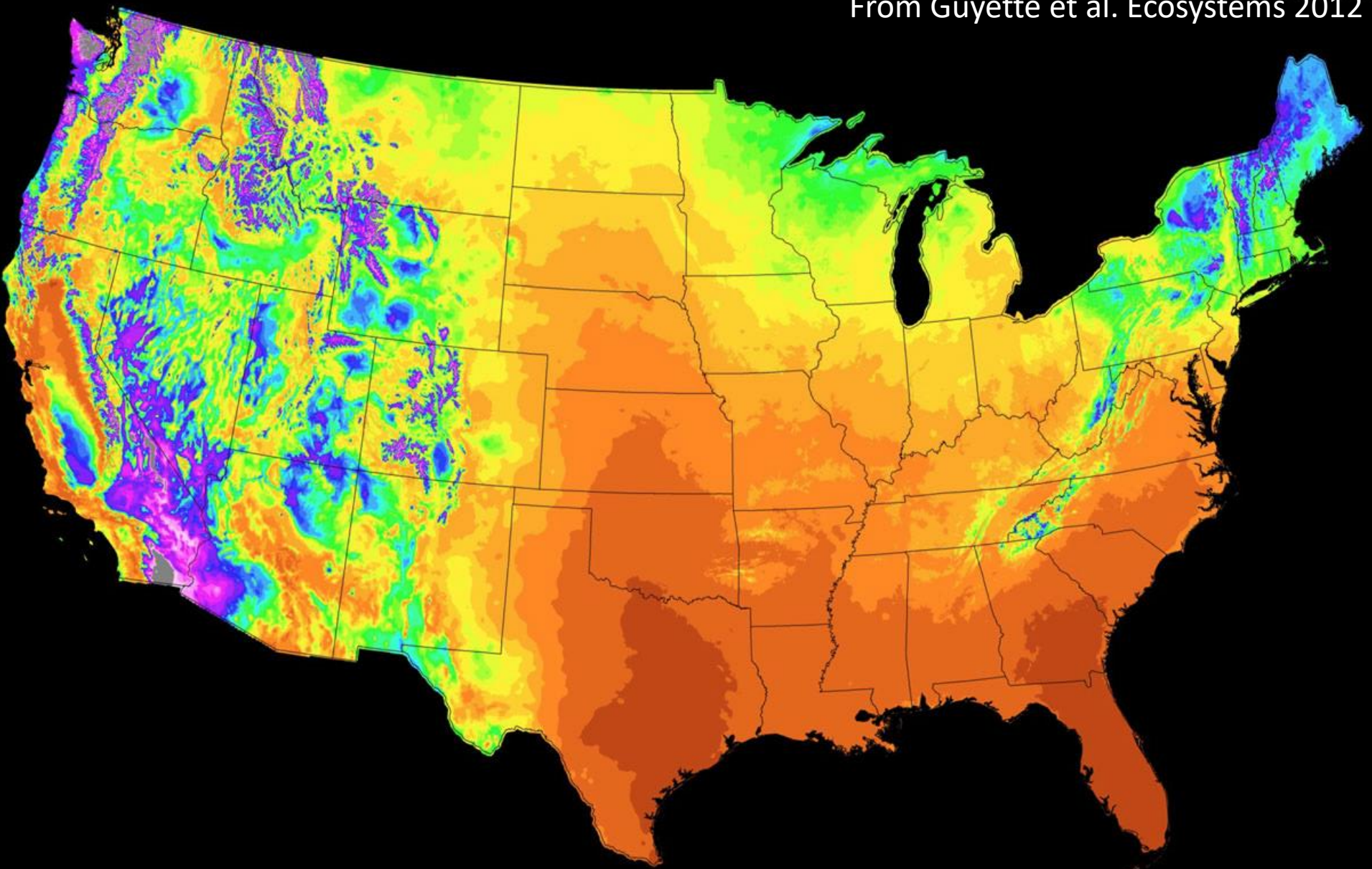
- Landscape of the Great Plains was shaped by disturbance
- Climate-drought, storms



- Grazing-large or small animal
- Fire-**anthropogenic, some lightning**
- We cannot change climate, but we can manage fire and grazing.....But do we?

The Past







1892 Driving cattle between Otoe and Pawnee



Wantland Homestead South of Stillwater, OT



1905 Cattle near Coalgate, IT on the way to Tulsa

Historical
Society ©



1889 Wagons crossing Salt Fork of Arkansas, OT

**1883 David Payne and boomers crossing
North Canadian River (Oklahoma/Lincoln
County area)**





1900 Unknown location in OK Territory

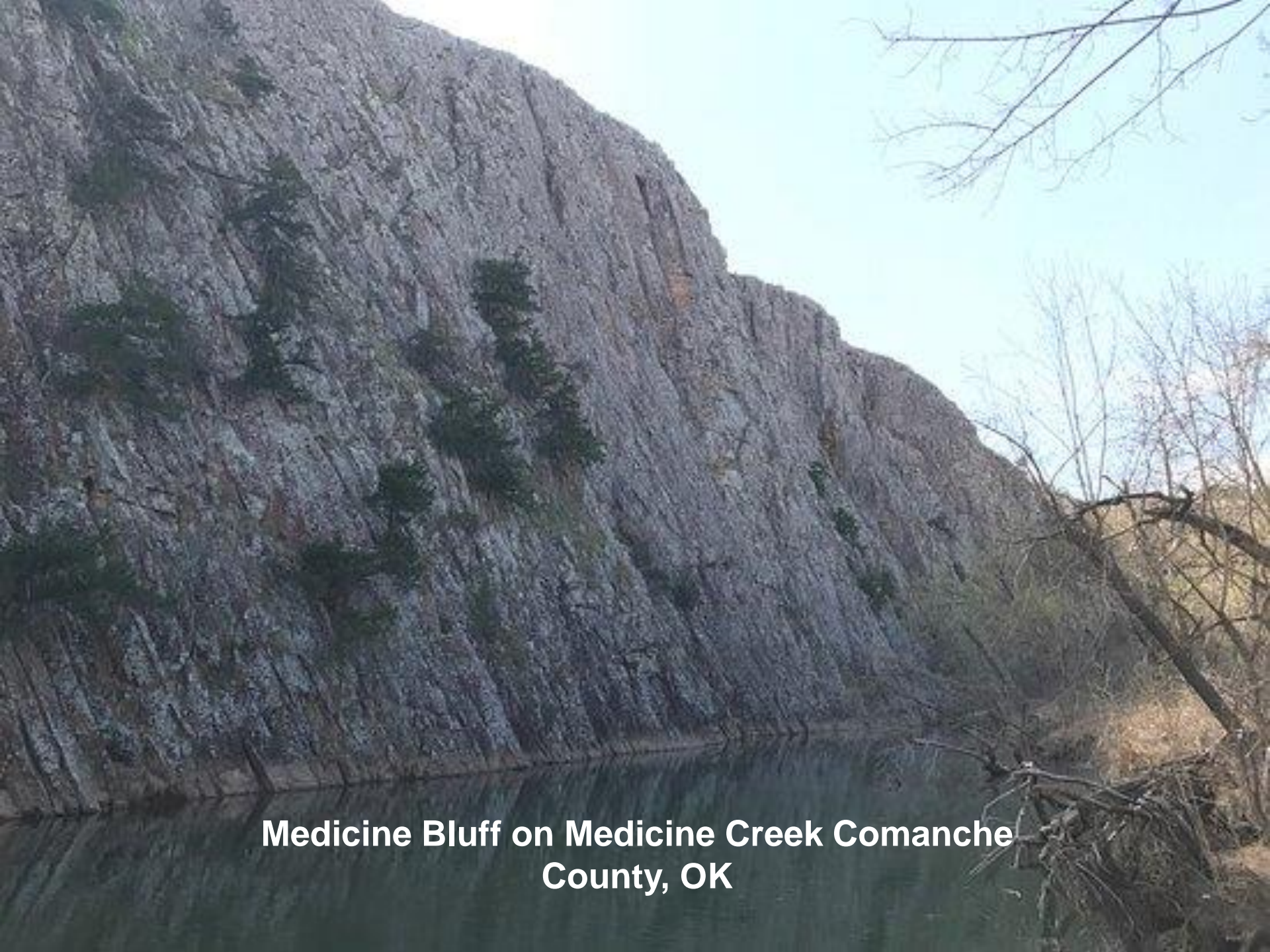
Eastern redcedar

- Native
- Non-sprouting
- Some tribes consider it sacred
- Why was it sacred?
- Removal of fire
- Planted
- Spread to the point of.....





**Medicine Bluff on Medicine Creek Comanche
County, OK**



**Medicine Bluff on Medicine Creek Comanche
County, OK**



Antelope Hills Roger Mills County, OK



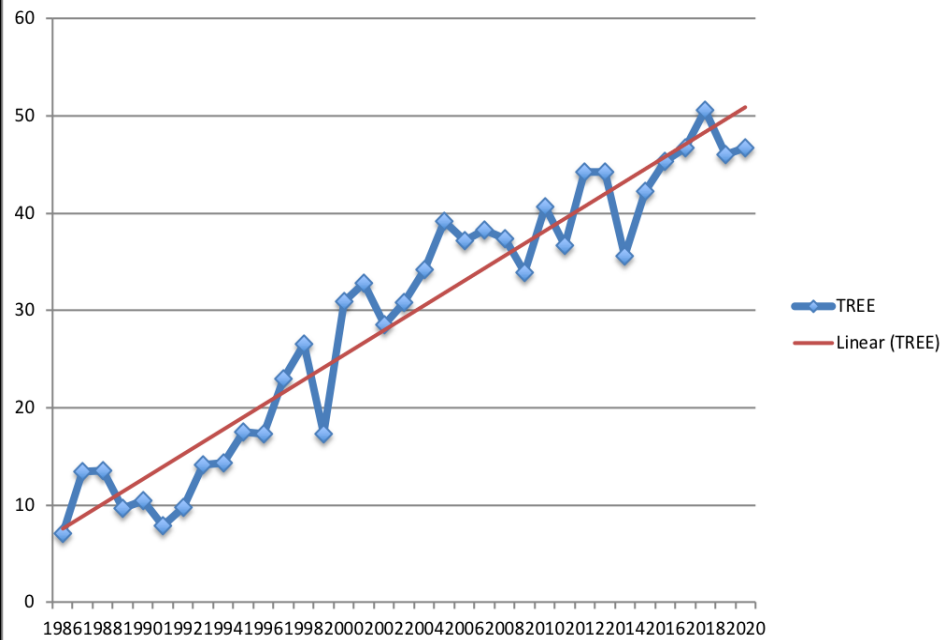
Mount Scott Wichita Mountains National Wildlife Refuge

Ignoring the past
has brought us
to....

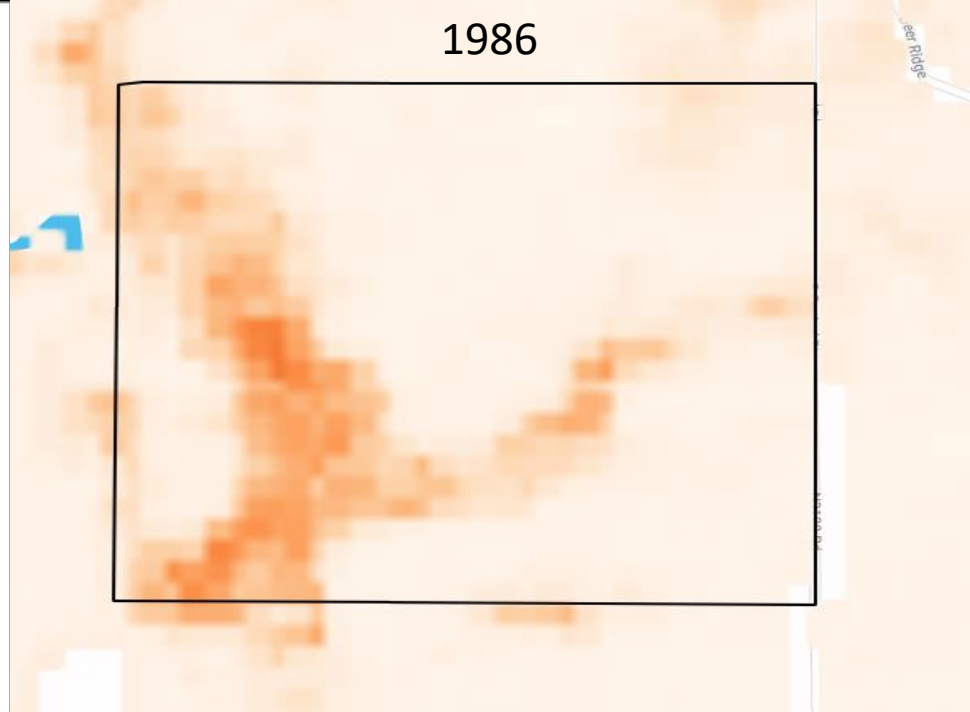
The Present



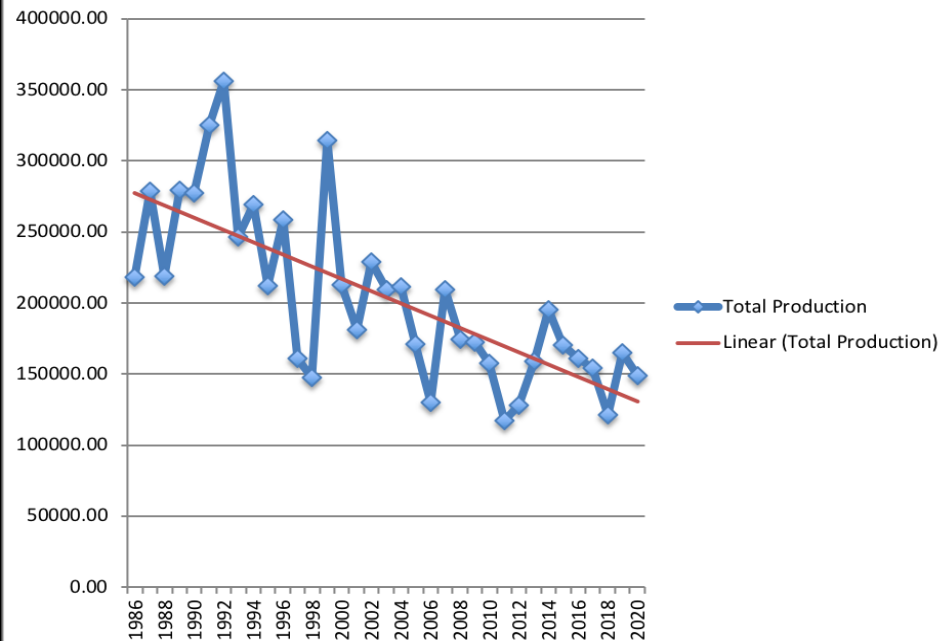
Tree Cover (%) (No Fire)



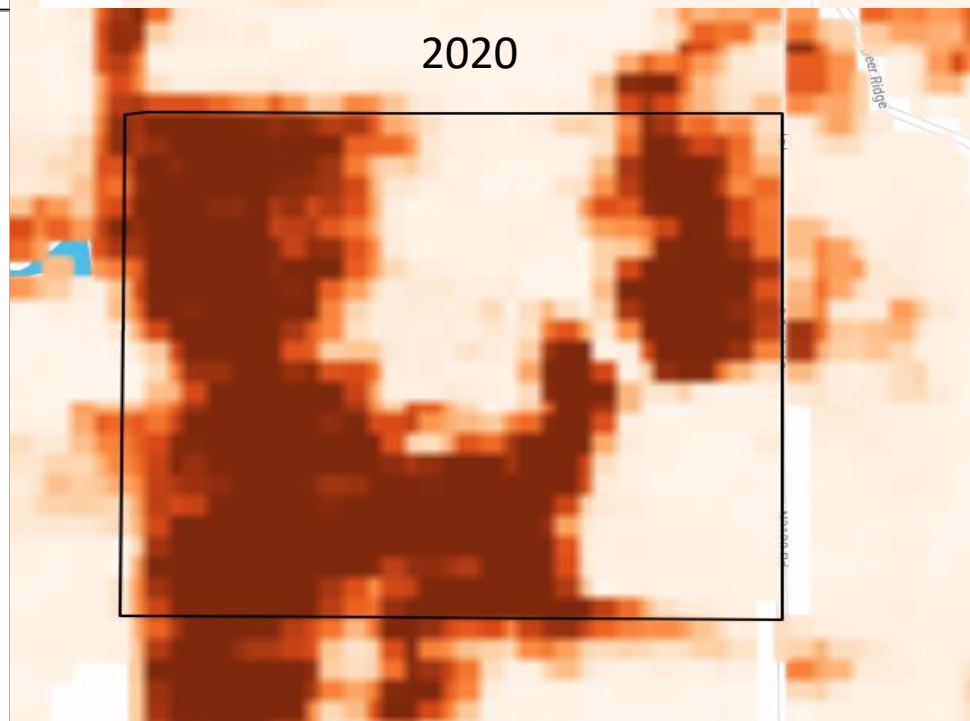
1986



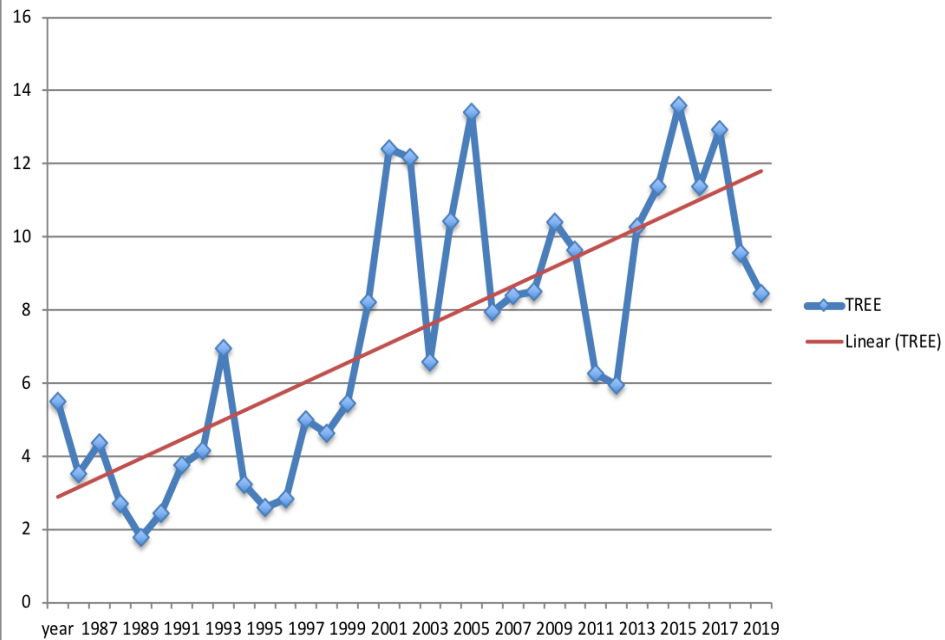
Total Annual Production (160 ac)(No Fire)



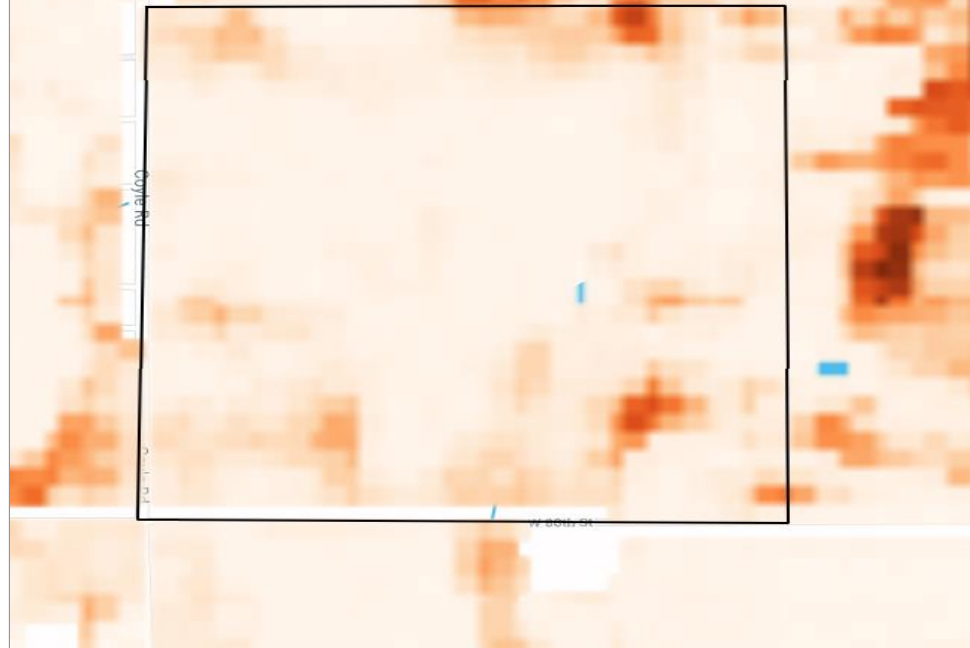
2020



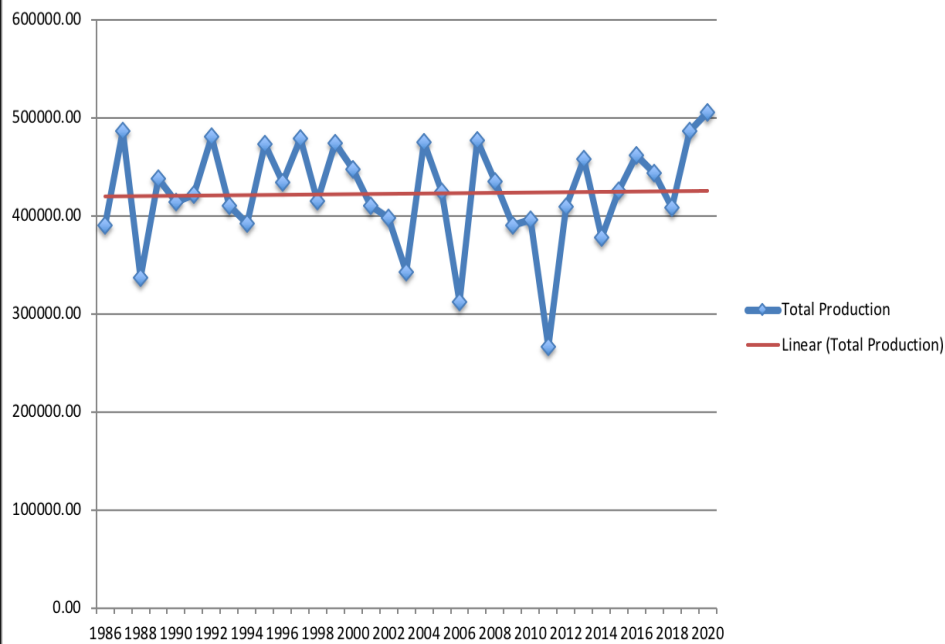
Tree Cover (%) (Fire)



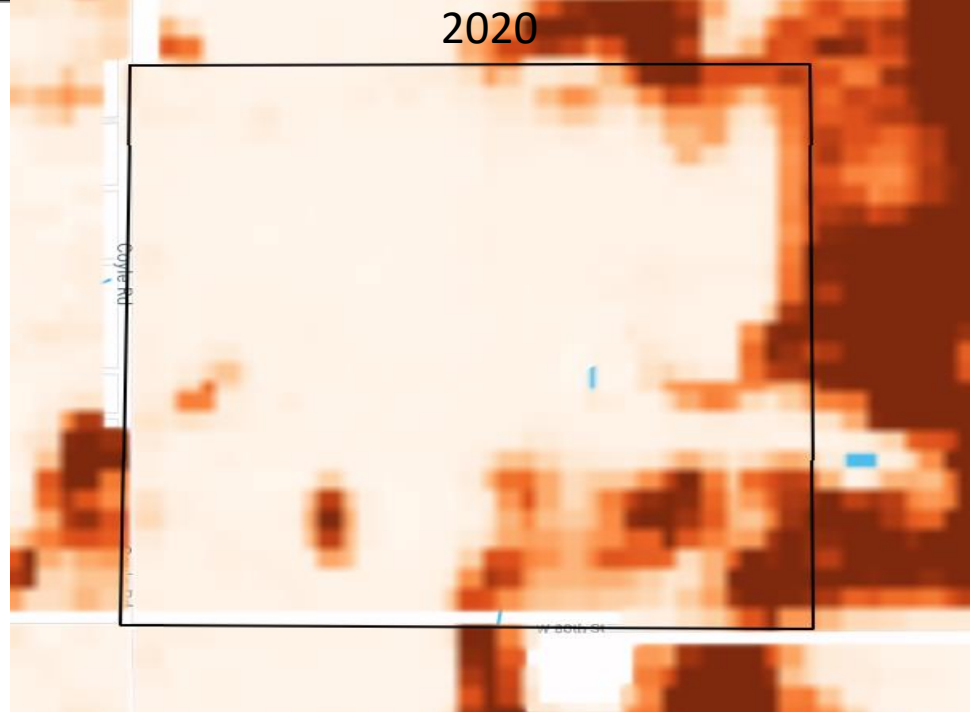
1986



Total Annual Production (160 ac) (Fire)



2020

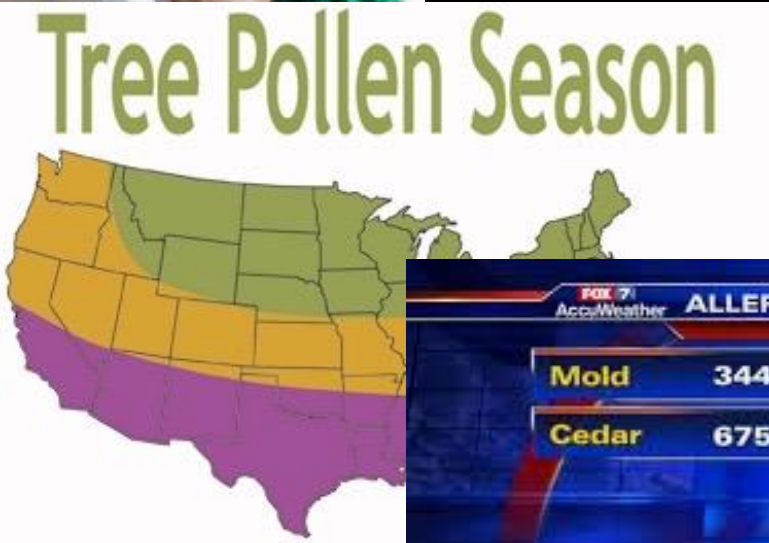




Clipped cedar, 1995 and 2011

Human Health Issues:

- Allergies
- Asthma



FOX 7
AccuWeather

ALLERGY COUNT

Mold	344	Moderate
Cedar	675	Heavy

allergistsofaustin.com
Dr. Doug Bastow
Dr. Thomas Leath

Wildfire:

- Loss of life
- Loss of property
- Firefighters at risk



So what is the cost of
doing nothing? Doing
nothing is a management
practice!





Doing nothing
requires more in
the long run!

Table 3. The average for practices using all estimated costs.

Practice		Cost per acre								
		Average	160	640	960	1380	160	640	960	1380
Mechanical control 11-30% canopy cover	acre	\$116.74	\$18,678	\$74,714	\$112,070	\$161,101				
Mechanical control 31-50% canopy cover	acre	\$186.74	\$29,878	\$119,514	\$179,270	\$257,701				
Mechanical control >51% canopy cover	acre	\$331.56	\$53,050	\$212,198	\$318,298	\$457,553				
Prescribed burn level herbaceous	acre	\$12.42	\$1,987	\$7,949	\$11,923	\$17,140				
Prescribed burn steep terrain herbaceous	acre	\$26.14	\$4,182	\$16,730	\$25,094	\$36,073				
Prescribed burn contractor	/mile	\$1,550.00	\$3,100	\$6,200	\$7,750	\$9,300	\$19.38	\$9.69	\$8.07	\$6.74
Firebreaks slight slope light equipment	foot	\$0.06	\$591	\$1,183	\$1,478	\$1,774	\$3.70	\$1.85	\$1.54	\$1.29
Firebreaks moderate slope medium equipment	foot	\$0.21	\$2,218	\$4,435	\$5,544	\$6,653	\$13.86	\$6.93	\$5.78	\$4.82
Firebreaks steep slope medium equipment	foot	\$0.80	\$8,448	\$16,896	\$21,120	\$25,344	\$52.80	\$26.40	\$22.00	\$18.37
Firebreaks re-construction existing	foot	\$0.09	\$950	\$1,901	\$2,376	\$2,851	\$5.94	\$2.97	\$2.48	\$2.07
Range deferment	acre	\$4.16	\$666	\$2,662	\$3,994	\$5,741				
Native pasture lease OK east 2018-2019	acre	\$17.97	\$2,875	\$11,501	\$17,251	\$24,799				

Table 5. Projected cedar cover, by NRCS category, through 2070.

Lake of the Arbuckles watershed area
88,560 acres with 86% classified as forest
or grassland/pasture

Cedar Cover Category	Acres of Land			
	2020	2030	2050	2070
0-11% Cedar	925	0	0	0
11-30% Cedar	1,920	7,434	13,444	0
30-50% Cedar	1,672	2,593	2,019	9
>50% Cedar	823	2,795	11,106	54,770
Total Area to treat	5,340	12,821	26,569	54,779



Table 6. Potential cedar cover growth scenarios, through 2070.

Cedar Cover Category	Number of Parcels			
	2020	2030	2050	2070
0-11% Cedar	1138	0	0	0
11-30% Cedar	138	1217	1100	0
30-50% Cedar	60	79	71	3
>50% Cedar	40	80	205	1373
Cedar Removal Cost Estimate	\$ 1,181,000	\$ 2,008,000	\$ 5,057,000	\$ 16,760,000



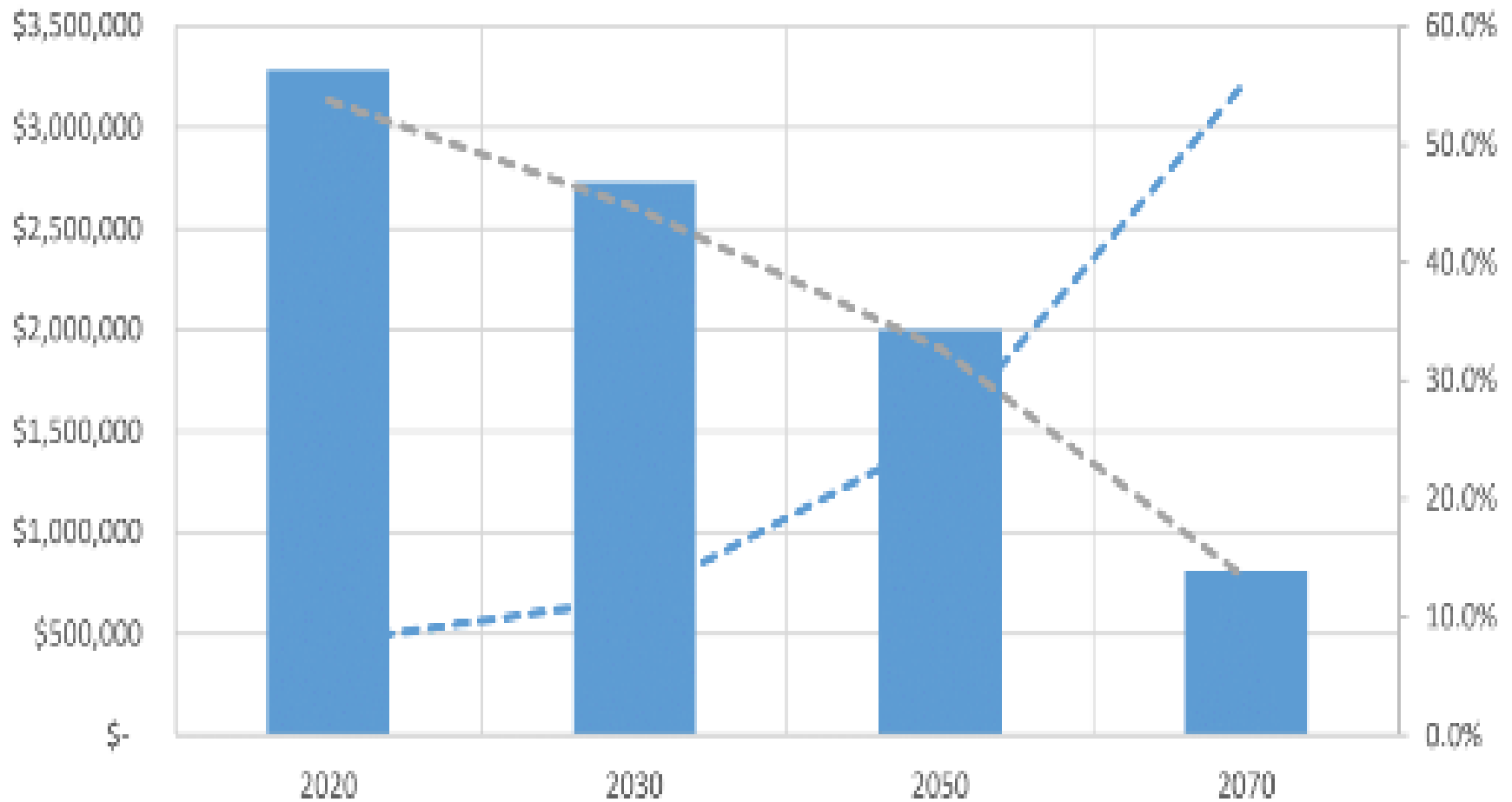


Figure 7. Simulated Cedar Growth, Pasture Reduction, and Potential Income through 2070.

**Lake of the Arbuckles watershed area 88,560 acres
with 86% classified as forest or grassland/pasture**

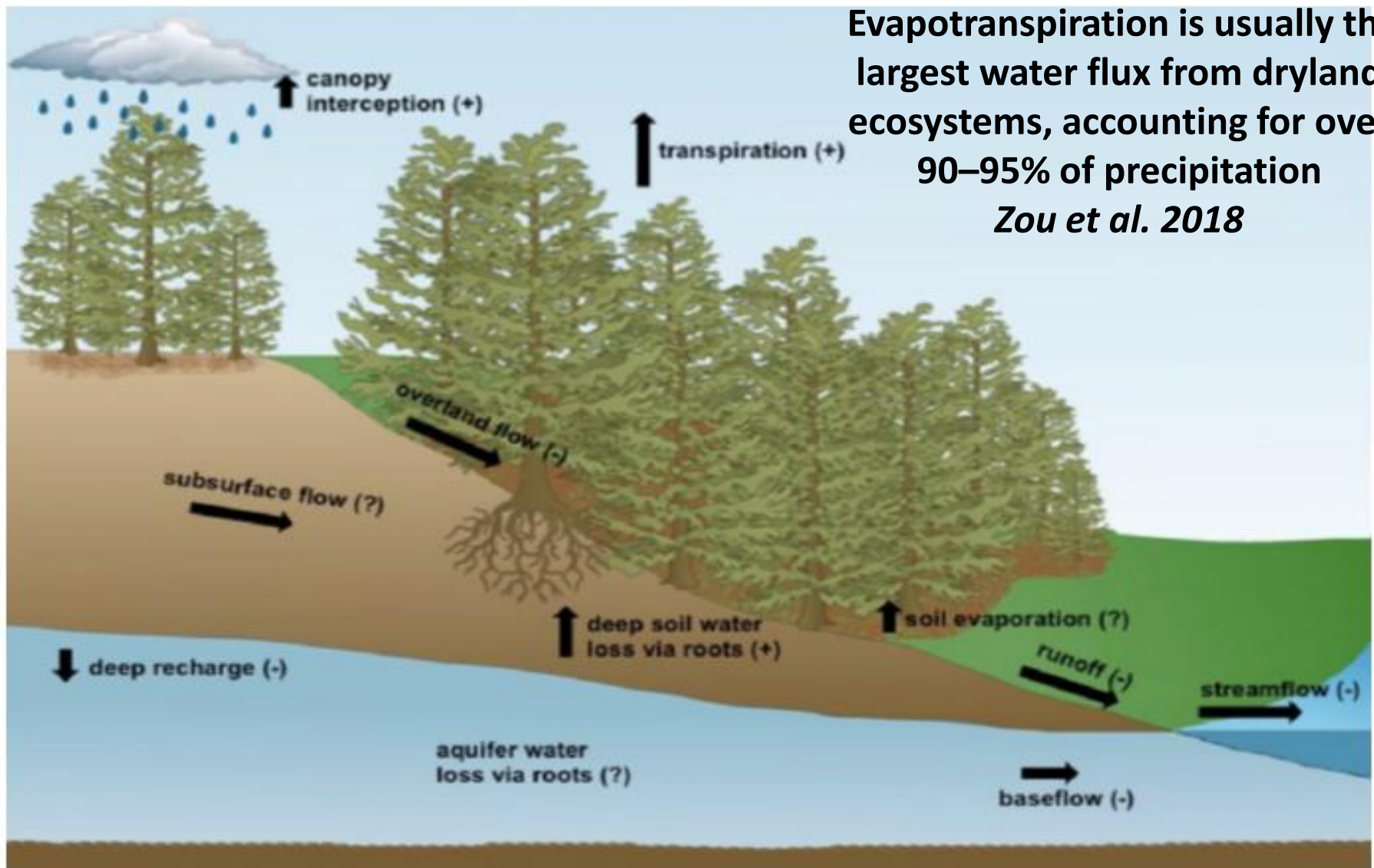


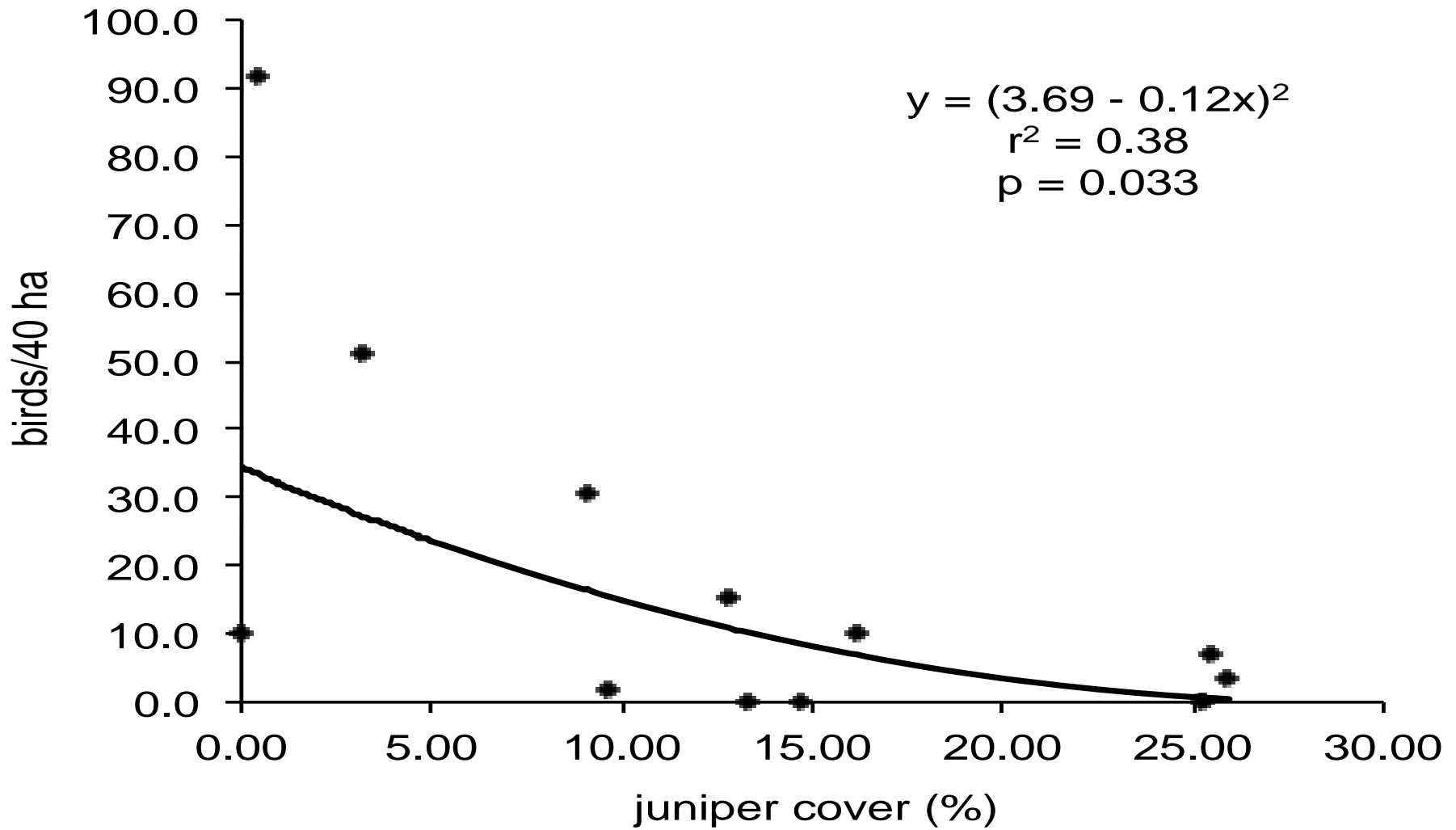
Figure 3. Graphic illustration of the current state-of-the-science on the alteration of hydrological components following a grassland transition to redcedar woodland. Arrow shows the direction of the flux or the flow path of each component. “+”, “-”, and “?” in the parenthesis represents “increase”, “decrease”, or “uncertain” of the magnitude of each component, respectively.

Table 1. Water balance on rangeland at the Texas Agriculture Experiment Station, Sonora, TX.

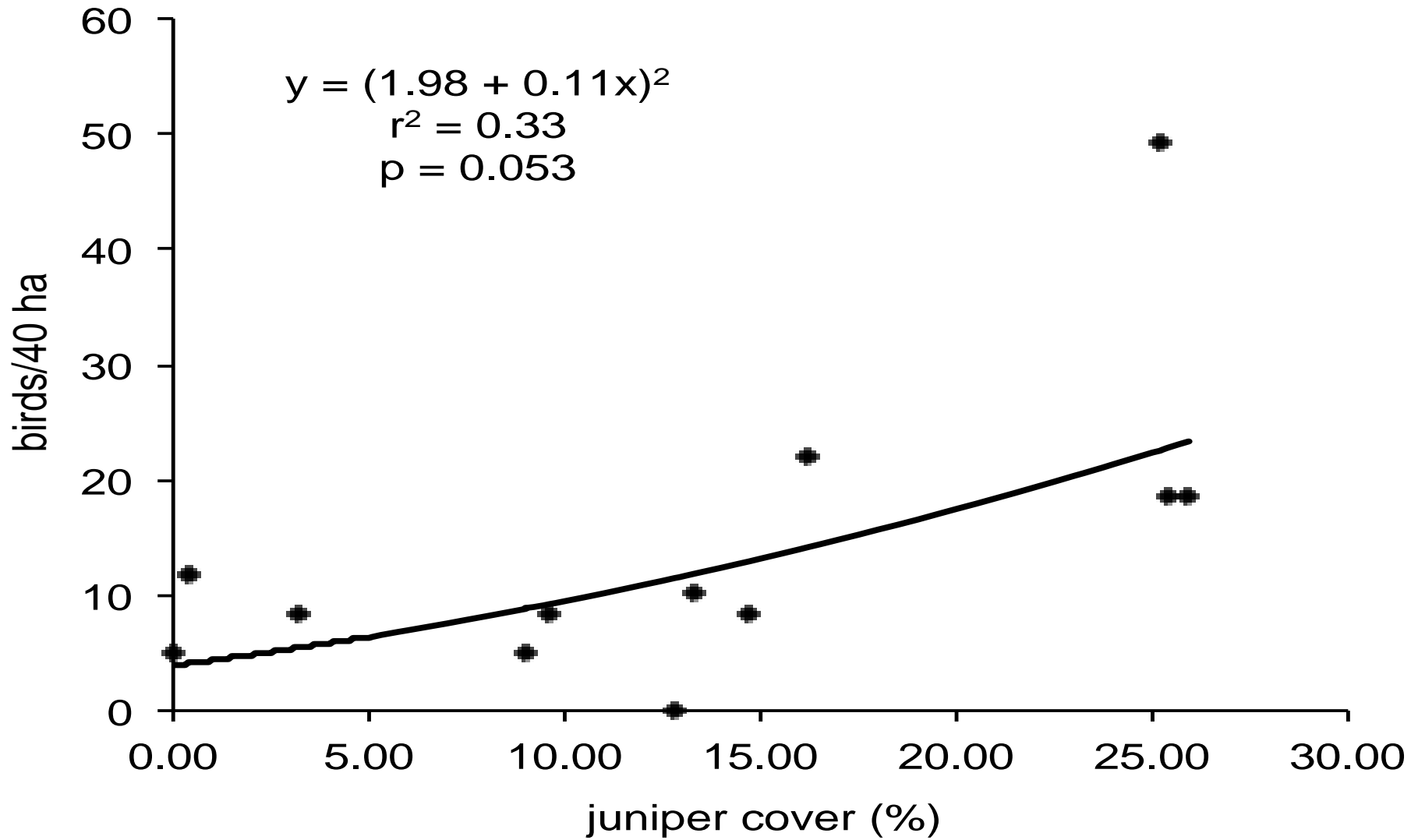
	100% Grass	70% Grass 12% Oak 18% Juniper	40% Grass 24% Oak 36% Juniper
Rainfall	22.6	22.6	22.6
Interception Loss	3.0	6.3	9.6
<i>Water Reaching the Soil</i>	19.6	16.3	13.0
Runoff	0.2	0.2	0.2
<i>Water Going in the Soil</i>	19.4	16.1	12.8
Evapo-transpiration	15.7	15.8	12.8
Deep Drainage	3.7	0.3	0.0
Moderate Stocking (animal units/sec)	34	22	11
3.7 Inches of Deep Drainage/yr = 100,500 Gallons/Ac/Yr			

interception loss via the canopy and litter, 20.3%, 34.0% and 53.9% of annual rainfall reaches soil under juniper and live oak. 81.9% and 89.2% of annual precipitation reaches the soil under grass cover.

From Thurow and Hester-How an increase or reduction in juniper cover alters rangeland hydrology



Relative abundance of bird species associated with grassland habitats plotted against canopy cover of *Juniperus virginiana*.



relative abundance of birds associated with woodlands plotted against canopy cover of *Juniperus virginiana*.

As few as 4 cedar / acre certain grassland birds are no longer found

What about others:

Lesser Prairie Chicken

Greater Prairie Chicken

Northern Bobwhite



The Future

- Are the changes reversible
- At what point do they become irreversible
- Time, how much do we have?



**We cannot wait!
Don't get side tracked!**

